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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/526,843 | 03/03/2005 | Chenghui Luo | fraunh01.049 | 9357 |

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| EXAMINER |
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GYORFI, THOMAS A

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| ART UNIT | PAPER NUMBER |
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2435

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01/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/526,843 | Applicant(s) LUO, CHENGHUI | |
| | Examiner Thomas Gyorfi | Art Unit 2435 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5 and 22-29 is/are allowed.
- 6) ☐ Claim(s) 6-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/7/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-29 remain for examination. The amendment filed 10/7/09 amended claims 1 and 6.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 10/7/09 has been considered by the examiner.

Response to Arguments

3. Applicant's arguments filed 10/7/09 have been fully considered but they are not persuasive. Based on Applicant's remarks (page 11 of the amendment) Examiner understands Applicant's position to be that the prior art references, and the Takeuchi invention in particular, does not disclose a class loader; but rather a separate and distinct component that decrypts encrypted Java byte code prior and then communicating the results to a conventional (though not explicitly mentioned) conventional class loader. Examiner disagrees, as Examiner believes that Applicant's position would deny to those of ordinary skill in the art the well-known and commonly understood knowledge that Java class loaders can and have been modified to allow the decryption of encrypted byte code as part of their operation. In particular, it is noted that class loaders in general are an essential component of Java virtual machines, without which said virtual machines would not be able to execute any Java software (see the "Java Security" [Oaks] reference, page 31); furthermore, Java by default provides

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programmers with the ability to create their own class loaders to implement any additional functionality not previously contemplated by the original developers of the Java language, including *inter alia* the ability to have the class loader implement various security policies (Oaks, pages 42-48, including “Implementing a Class Loader” and “Implementing the SecureClassLoader Class”). Furthermore, the patent literature comprises many examples of improvements to the Java virtual machine where a class loader has been explicitly modified to be able to decrypt and load encrypted Java classes: see U.S. Patent 7,590,683 to Lambert (col. 2, lines 48-53), U.S. Patent Application Publication 2003/0074563 to Spacey (paragraph 0033) and U.S. Patent Application Publication 2002/0055910 to Durbin (paragraphs 0045—0058, and Fig. 4). Thus Examiner believes that despite the explicit lack of mention of a class loader in the Takeuchi disclosure, one of ordinary skill in the art of Java programming would have reasonably inferred that the new and non-obvious functionality disclosed regarding the pre-processing of encrypted Java byte codes would likely have been implemented as part of a custom-developed class loader designed for that purpose.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 6-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (U.S. Patent 6,820,200) in view of “Java Tip 22: Protect Your Bytecodes from Reverse Engineering/Decompilation” (hereinafter, “Mahmoud”).

Regarding claims 6 and 14:

Takeuchi discloses a component of a Java VM (and method for same) comprising: using at least one association between the encrypted forms and information used to resolve the symbolic names defined in the class to resolve symbolic names in the program (col. 8, line 50 – col. 9, line 5); and adding a method to the program which determines whether the program has been modified by the host (col. 8, lines 20-50).

Although Takeuchi discloses one association between the encrypted symbols and the decrypted symbols, there does not appear to be any other association of any kind. However, Mahmoud discloses wherein one may create a different kind of association (between the original symbols and obfuscated symbols: pages 2-4, "Crema to the Rescue") that is also useful for preventing reverse engineering. The claims are thus obvious because all the claimed elements were known in the art, and one of ordinary skill in the art could have combined them by known methods with no known change in their respective function (i.e., if one were to provide as input to Takeuchi's program certificate authority server the obfuscated program generated by Mahmoud's Crema program, rather than one's original Java program, the claim limitations would be satisfied in full), and the combination would have yielded predictable results to one of ordinary skill in the art. Additionally, one would have been motivated to combine the two references because both are directed to methods to prevent reverse engineering of one's Java code (Mahmoud, bottom of page 3; Takeuchi: col. 1, lines 50-67).

Examiner takes Official Notice that the one of ordinary skill in the art of Java programming would likely have implemented the prior art's cited functionality for pre-processing Java programs by creating a customized Java class loader (see the Response to Arguments" above for sources).

Regarding claim 7:

Takeuchi further discloses wherein the method is encrypted prior to being added to the program and the improved class loader decrypts the method on adding the method to the program (col. 8, lines 20-50).

Regarding claim 8:

Takeuchi further discloses wherein the program includes information from which the method determines whether the program has been modified by the host (any program that does not decrypt properly has obviously been modified: col. 9, lines 45-67; see also col. 11, lines 20-25 and col. 12, lines 35-40).

Regarding claims 9 and 17:

Takeuchi further discloses wherein the program includes a static watermark (col. 11, lines 35-50) and the static watermark is the information from which the method determines whether the program has been modified by the host (col. 12, lines 15-40).

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Regarding claim 10:

Takeuchi further discloses wherein the static watermark's value is a digest of the code prior to the addition of the static watermark (col. 11, lines 60-65).

Regarding claims 11 and 19:

Takeuchi further discloses wherein the static watermark is at a location in the program determined by a key and the method has access to the key and uses the key to locate the static watermark (col. 12, lines 15-40).

Regarding claims 12 and 20:

Takeuchi further discloses wherein the improved class loader has access to an encryption key that was used to produce the encrypted forms in the first association (col. 9, lines 45-67); and the improved class loader uses encryption key to produce second association on loading the class (Ibid).

Regarding claims 13 and 21:

Takeuchi further discloses wherein the program includes an encrypted form of the encryption key used to produce the second association (col. 10, line 55 - col. 11, line 15), and the improved class loader obtains the encryption key by using a decryption key to decrypt the encrypted form of the encryption key (Ibid).

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Regarding claim 15:

Takeuchi further discloses wherein the added method is encrypted (col. 11, lines 55-60); and the step of adding the method includes the step of decrypting the method (col. 12, lines 15-25).

Regarding claim 16:

Takeuchi further discloses wherein the program includes information which the added method uses to determine whether the program has been modified by the host (the digest: col. 11, lines 60-65 and col. 12, lines 25-40).

Regarding claim 18:

Takeuchi further discloses wherein the static watermark's value is a digest of the code prior to the addition of the static watermark (col. 12, lines 15-40) and wherein the added method reads the static watermark, recomputes the digest, and compares the recomputed digest with the watermark's value (Ibid, particularly lines 25-40).

Allowable Subject Matter

6. Claims 1-5 and 22-29 are allowed, for reasons as discussed in the previous Office Action filed 7/9/09.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas Gyorfi whose telephone number is (571)272-3849. The examiner can normally be reached on 8:30am - 5:00pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Vu can be reached on (571) 272-3859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TAG

1/20/10

/Kimyen Vu/

Supervisory Patent Examiner, Art Unit 2435